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ABSTRACT

This paper analyzes the economic costs and benefits of Minnesota's nonresident tuition policies and tuition reciprocity agreements to the state. It also assesses the effects that modifications to these policies and agreements would have on migration patterns and the costs and benefits arising from such modifications. The methods used, such as student price response coefficients, migration rates, and estimates of lifetime tax payments, provide the basis for determining the economic value of reciprocity agreements and nonresident tuition policies to the state of Minnesota. These methods may be useful to other states in assessing migration patterns and nonresident tuition policies. Results of the analysis show that reduced tuition for nonresidents is of great benefit to the state's economy. However, policies that provide incentives for Minnesota residents to leave the state for college are costly to the state. (Contains 11 tables, 3 figures, and 20 references.) (Author)

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Assessing the Value of Non-Resident Tuition Policies in the Face of State Workforce Development Needs: A Minnesota Perspective

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ABSTRACT

Assessing the Value of Non-Resident Tuition Policies in the Face of State Workforce Development Needs: A Minnesota Perspective

This paper analyses the economic costs and benefits of Minnesota's non-resident tuition policies and tuition reciprocity agreements to the state. It also assesses the effects that modifications to these policies and agreements would have on migration patterns and the costs and benefits resulting from such modifications.

The methods used, such as student price response coefficients, migration rates and estimates of lifetime tax payments, provide the basis for determining the economic value of reciprocity agreements and nonresident tuition policies to the state of Minnesota. These methods may be useful to other states in assessing migration patterns and nonresident tuition policies. Results of the analysis show that reduced tuition for non-residents is of great benefit to the state's economy. However, policies that provide incentives for Minnesota residents to leave the state for college are costly to the state.

Introduction

Minnesota policy-makers are assessing the continued value of the tuition reciprocity agreements that have existed between Minnesota and three of its neighbors, North Dakota, South Dakota, and Wisconsin. Since the early 1970's these agreements have included a number of provisions affecting both the cost of attendance for the affected students and costs and benefits to each state that is party to them.

This paper analyzes the effects of the agreements on migration patterns of students and the costs and benefits associated with them. It also assesses the effects that modifications to the agreements would have on migration patterns and the costs and benefits resulting from such modifications. It begins with a discussion of the factors that have lead to concerns about current state policy as well as a review of relevant literature and an analysis of the data to determine the costs and benefits of the agreements. In addition, an analysis is done using data and econometric methods from national and other state sources, to answer four questions necessary to determine whether Minnesota should keep, modify or end the agreements. These are:

1) At what rates do nonresidents stay in Minnesota after graduation compared to Minnesota residents and, conversely, if Minnesotans leave to attend college, at what rate do they return?

2) What are the financial returns to the state when a student stays in Minnesota and do the returns offset any additional costs associated with subsidizing their college attendance?

3) What value does the state derive from subsidizing the students who come to Minnesota from reciprocity states and does this value outweigh the costs of the reduced tuition rates they pay?

4) What value does the state of Minnesota derive from subsidizing the students who leave to reciprocity states and does this value outweigh the benefits that would have accrued to Minnesota had they stayed?

The methods used here provide the basis for exploring the value, in economic terms, of reciprocity agreements and nonresident tuition policies to the state of Minnesota. Such methods may be useful to other states in assessing migration patterns and nonresident tuition policies and include:

1) Estimates of changes in migration patterns using standard Student Price Response Coefficients (SPRC's).

2) Estimates of the degree to which students stay in the state of college attendance.

3) Estimates of tax revenue generated by college graduates who stay in, and return to Minnesota to work.

4) The application of a multiplier effect of additional revenues on the state economy.

Finally, some preliminary recommendations are offered as well as a discussion of the need to collect and analyze additional information to provide policy-makers better information for informed decision making.

Policy Debate in Minnesota

History and Provisions of the Agreements

The Higher Education Services Office (HESO) on behalf of the State of Minnesota negotiates Minnesota's tuition reciprocity agreements. Generally, they include the following arrangements. Students from each state can choose to attend college in any of the agreement states at a substantially reduced rate of tuition. However, the rate of tuition paid is not always the rate paid by residents of the state, as one might assume, but is often the rate that the prospective student would have paid had he or she chosen to attend a similar college in their home state. [1]

In addition, each state has agreed to compensate the other states for the costs associated with the disproportionate flow of students between them based on the recognized instructional costs of the two states. More Minnesota students are going to North Dakota and Wisconsin than are coming to Minnesota from these two states. Thus, Minnesota is scheduled to pay each $5.25 million during the 2001-02 biennium. The flow between Minnesota and South Dakota is about equal and, therefore, no payment is made.

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[1] This was a modification made to the agreements in 1983. Prior to this, students paid the instate rate at the institution they attended.

The very first agreement between Minnesota and Wisconsin was hailed by some as a benchmark in inter-state cooperation and was predicted to set the stage for other states to follow suit. "The states of Minnesota and Wisconsin have agreed to a comprehensive student exchange program that will eliminate the concept of nonresident tuition" (Carbone, 1973). However, almost thirty years later no other states have established similar arrangements with their neighbors and Minnesota policy-makers are reassessing the continuing benefits of these agreements to the state.[2]

Decision-makers are questioning tuition reciprocity policies, in part because Minnesota faces a skilled worker shortage. According to a recent report by the Minnesota Department of Trade and Economic Security (September, 2000), Minnesota is facing a shortage of over 200,000 skilled workers by the year 2008. These concerns about Minnesota's workforce culminated in an "Economic Summit" sponsored by the President of the University of Minnesota and attended by the Governor and over 1000 other elected, business and civic leaders. The message of the conference was that Minnesota faces an acute shortage of skilled and technical workers in the coming decade. The call went out to business, government and higher education institutions to focus efforts on growing more workers from within, as well as attracting from outside the state, increased numbers of high skilled "new economy" workers. Also, some evidence, such as the level of state appropriations and rate of high school graduates attending college suggests that Minnesota does not do as well as its neighbors or the nation in general in providing higher education resources to its residents. Thus, policies like the reciprocity agreements are particularly relevant to understanding Minnesota's ability to meet the demand for a skilled workforce in the years ahead.

The state of Minnesota can do certain things to fill the expected gap between anticipated workforce needs and the estimated number of skilled workers that would be available given current policies and trends. Many opportunities to reduce the gap are worth considering. Two are the focus of this paper. One is to assess the value of those parts of the tuition reciprocity agreements that call for the subsidy of the cost of attendance for students coming to Minnesota from reciprocity states. This involves determining if paying for their education is less costly than the benefit of their contribution to the state in terms of additional tax revenues and will include an assessment of the "staying" rate of students after they graduate. Graduates who leave provide little benefit to the state. However, since it is possible, in fact true, that some Minnesota residents also leave the state after graduation, the appropriate standard by which to measure the staying rate of nonresidents is the ratio of nonresident stayers to resident stayers.

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[2] A number of interstate tuition compacts exist but none are as extensive as those between Minnesota and its neighbors.

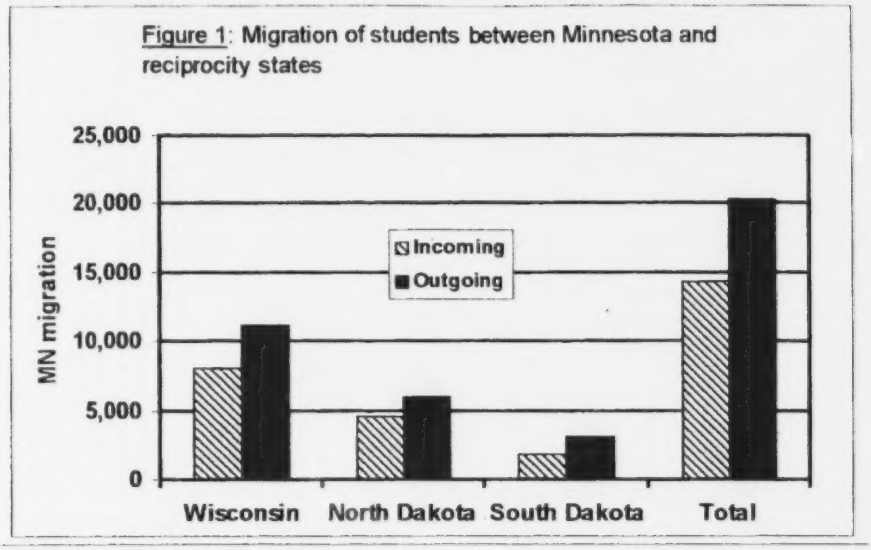
Also, the agreements provide incentives, through reduced tuition, for Minnesota high school graduates to leave the state to attend college elsewhere. If many of these students fail to return to Minnesota, then such agreements may also be impediments to meeting the state's workforce needs. Understanding this issue will entail an evaluation of the degree to which these students stay in the state that they graduated from college or return to Minnesota after completion of their college careers. It will also require an assessment of the degree to which these students would stay in Minnesota if reciprocity agreements were modified or canceled and reciprocity states required Minnesota students to pay nonresident rates like other nonresident students attending in those states.

Workforce issues are not the only reasons for a renewed interest in evaluating the agreements. The subsidy of Minnesota students who choose to leave the state can be considered a form of financial aid. Thus, it should be evaluated in terms of its consistency with the overall goals of other financial aid programs. Minnesota and federal financial aid programs are designed to assist students from low income families to attend college. The $10.5 million payments to Wisconsin and North Dakota can be viewed as a financial aid program in as much as it is the part of the agreement that allows Minnesota residents to attend college in these states at reduced rates. But, unlike other financial aid programs such as the Pell and Minnesota State Grants, no means testing is done to determine whether students who benefit have a financial hardship. In fact, evidence suggests that students who migrate across state lines tend to come from more affluent families than the general student population.

Legislative Action on Tuition Policy for Nonresidents

Considerable debate on reciprocity agreements occurred during the 2001 legislative session. Legislation was introduced and passed that requires the Higher Education Services Office (HESO) to renegotiate these agreements. HESO must report its progress in the 2002 session.

Legislative concerns about the agreements center on four issues. First, they contribute, in part, to a large number of Minnesota high school students leaving the state to attend college elsewhere due to the attraction of lower tuition rates than would normally be the case. Thus, Minnesota is a net exporter of college bound students to reciprocity states. Over 20,000 students from Minnesota are currently attending one of the three reciprocity states. Conversely, 15,000 residents from these states are coming to Minnesota *(see **Figure 1**)*.



A second concern is that because of the nature of the contractual agreements with these states, many students pay tuition equal to what they would pay at a similar institution in their home state. But because Minnesota tuition rates are higher and rising faster than the reciprocity states, many Minnesota students are paying more tuition to attend the out-state schools than students from those states. In addition, over 9,000 students from reciprocity states attending in Minnesota are paying tuition rates lower than Minnesotan students at the same Minnesota institutions. To use a poignant example, a resident of Wisconsin attending the University of Minnesota, Twin Cities campus pays about $1,000 less than a resident of Minnesota must pay. Conversely, a Minnesota choosing to attend the University of Wisconsin, Madison must pay $1,000 more than a Wisconsin resident would pay. This was not always the case. An interesting aspect of the original agreements was that nonresident students paid the resident rate in the state that they were attending college. However, this changed following the renegotiations that occurred in 1983. At the time, the effect of the change was nominal since the tuition differential between states was insignificant.

A third concern is that, as a result of the difference in the numbers of students being exported versus imported, and consistent with the provisions of the agreements, Minnesota makes a payment to North Dakota and Wisconsin. Minnesota will be making a payment in this biennium of $10.5 million. Over the past ten years Minnesota has made such payments for a total of $37 million.

Fourth, the tuition policy trend in Minnesota is to reduce the number of students who pay nonresident rates for all nonresidents, whether or not they come from reciprocity

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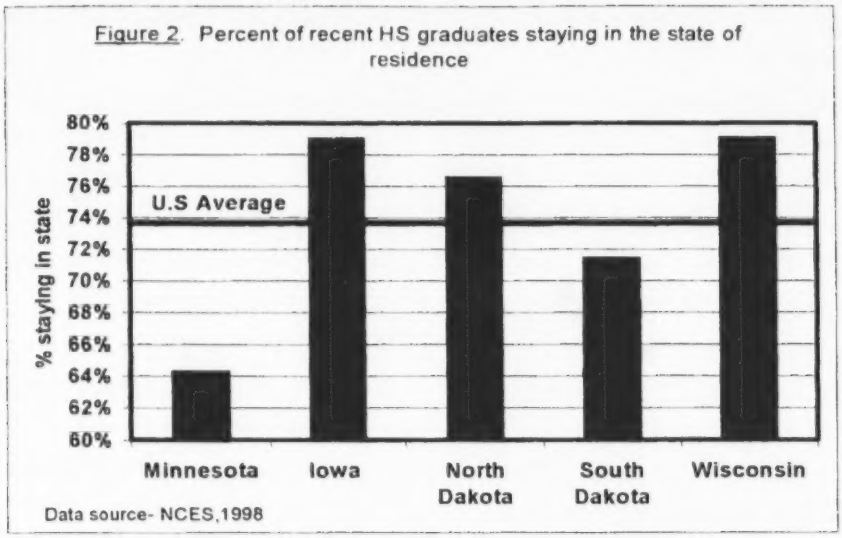
states. The Minnesota State College and University System (MnSCU) proposed (but did not receive) in its biennial budget a $27 million appropriation to reduce to instate rates the current nonresident tuition paid by nonresident, nonreciprocity students (NRNR's or "narnars"). These students are the students coming from outside Minnesota, but not from one of the three reciprocity states; North Dakota, South Dakota, or Wisconsin.

Indeed, MnSCU has freed its institutions to go their own way in establishing nonresident tuition policies and has incorporated into its recently adopted allocation formula modest incentives to its individual campuses to reduce their nonresident rates for NRNRs. Many have taken steps on their own and for their own reasons (such as enrollment management) to discount tuition rates for NRNRs. For example, St. Cloud State University, the largest institution in the MnSCU system with over 15,000 students, has reduced its charges to its 900 international students to the instate tuition rate. MnSCU estimates that only 55% of its NRNRs are paying at the nonresident rate. Thus, the treatment of reciprocity state students is increasingly becoming indistinguishable from other nonresident students for tuition purposes. At the state universities, less than a third of the NRNRs are actually paying nonresident tuition rates. It is likely that, given current incentives and the obvious trends, few if any NRNRs will be paying nonresident tuition in the near future. Thus, the reciprocity agreements, that cost the state millions of dollars and give incentives to students to leave, may no longer be relevant in light of this trend.

Broader Concerns About Minnesota's Higher Education Investment

The flow of students out of Minnesota is not limited to reciprocity states. Minnesota lags well behind the nation and neighboring states in the number of high school students who stay in the state for college. Only 63% of Minnesota high school graduates stay in the state for college compared to the national average of 74%. Of all the states in our region, only Minnesota is below the national average (See ***Figure 2***). Wisconsin, North Dakota and Iowa have significantly higher percentages of their recent high school graduates attending their public colleges (71%, 72% and 68% respectively). Thus, Minnesota must be particularly sensitive to policies that affect the migration of its residents out of the state and nonresidents into the state.



Rationale for Current Agreements

The tuition reciprocity agreements have a number of benefits that argue in their favor. First among these is the "choice" argument. Allowing Minnesota residents to attend at colleges in neighboring states significantly expands the number of options available to them. In some cases, the educational programs they seek in neighboring states are not available in Minnesota, or are very much farther away than an institution in a neighboring state.

Also, the agreements are seen as an efficient means to supplement the state's workforce by having some Minnesota residents educated and trained in other states. Presuming that many of the Minnesota students who attend college in neighboring states return (an assertion made by HESO), it can be argued that some of them are obtaining training in disciplines that Minnesota colleges lack the necessary capacity to meet the state's workforce needs. Therefore, having residents trained at low cost in other states is an economical way of training the needed workforce. Nursing, engineering, aeronautics, pharmacy and teacher training are just a few of the programs from which Minnesota will need to draw additional workers beyond the current capacity of our higher education infrastructure. This argument hinges on the assumption that these students return to Minnesota to work after they graduate.

The diversity argument can also be compelling. From an educational point of view, having a significant number of students from other states adds to the richness of the

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educational experience for Minnesota's students. In order to attract the large numbers of students to Minnesota from reciprocity states, the argument goes, Minnesota must "reciprocate" with similar opportunities for its residents to attend in these other states.

It is important to note, however, that nothing prevents Minnesota from unilaterally offering lower tuition rates for students from the three neighboring states, or any state and country. As has been discussed previously, and will be analyzed more fully later, a considerable amount of subsidy is already occurring for students coming to Minnesota from places other than the three reciprocity states.

Applying Econometric Methods to Tuition Reciprocity Policies

Effect of Changes in Tuition on Enrollment

A number of issues need to be addressed in order to determine the benefits of the current agreements and the changes that would occur if the agreements are modified. One of these is the effect on enrollments if tuition is substantially changed.

Few issues in the higher education literature have been more thoroughly researched than the effect of price (tuition) on enrollment. The primary purpose of studies of student price response is to assist institutions and state and federal policy-makers in making enrollment and pricing decisions such as that under consideration here. In their book, Keeping College Affordable, McPherson and & Shapiro summarize the overall effects of costs of attendance on enrollments. "Although the studies differ widely in data sources and estimation techniques, they tend to agree on two main points. First, student decisions to enroll in college respond positively, and non-trivially, to both price cuts and aid increases. Second, decisions about where to attend school also respond non-trivially to changes in the relative prices of schooling alternatives" (1991, p 44).

Leslie & Brinkman (1988) have done one of the most comprehensive analyses on the effect of tuition and financial aid changes on enrollments. They performed a meta-analysis involving 25 different studies of the price effects, or elasticity of demand, on enrollment completed during the '70s and '80s. Using what they called a standardized Student Price Response Coefficient (SPRC) they found, on average, an elasticity of -.7 SPRC for every $100 increase in tuition price (in 1982-1983 prices). These results were for first time enrolling 18-24 year old freshman. The interpretation of these numbers is that for a $100 increase in tuition, enrollment could be expected to drop (using a SPRC of -.7). 7 tenths of a percent per $100 or 7% for every $1,000

increase in tuition. Conversely, a drop of $1,000 would have the effect of 7% increase in enrollment (again in 1982-83 dollars). They indicate that a good SPRC estimate for use by states would be between -.5 and -.8, depending on the type of institution to which it is applied. They conclude that for public institutions an SPRC coefficient of -.7 or -.8 is valid when two year colleges are included, and -.6 or -.7 when they are excluded. Values at the lower end of the range may be more appropriate for selective universities and values at the higher end of the range for less prestigious or selective universities would be more appropriate. (p. 132).

More recently, Heller (1997) revisited the Leslie and Brinkman research to determine the continuing validity of their earlier work in light of more recent data and changes in the higher education landscape. He confirms the strong negative relationship established by the earlier work between tuition and enrollment. The "...fundamental relationship - the downward sloping demand curve for higher education found by Leslie and Brinkman and other earlier researchers - has been confirmed." Heller goes on to suggest that if anything, the sensitivity to price may be even higher than previously estimated if the relationship is curvilinear because tuition costs today are much higher than was the case when many of these studies were done. This paper will apply the SPRC models from these studies to assess the impact of changes in the reciprocity agreements.

Cameron and Heckman (1999), in analyzing the impact in changes in financial aid and tuition, found a relationship between tuition and enrollment showing that for every $1,000 in change in tuition, enrollment is affected in the reverse by 6-8%. Again, this is very consistent with the Leslie and Brinkman analysis.

A regional study by Brown and Johnson (1987) analyzed the effect of fluctuations in nonresident tuition on enrollments at South Dakota colleges during the timeframe that the reciprocity agreements came into effect. They were able to establish a strong inverse relationship between tuition rates and the enrollments of nonresidents in two important respects. First, they tracked the relationship between price (defined as the ratio of nonresident tuition charges in South Dakota to the tuition charge in the state from which the student migrated) and enrollment at comparable institutions in each of the surrounding states for each of SD six public institutions. Their findings showed a strong inverse relationship between tuition and enrollments. Second, and perhaps most illuminating, was that the impact of the implementation of the new reciprocity agreement between Minnesota and South Dakota in 1978 could clearly and dramatically be seen in enrollment spikes of Minnesota migrants at all six South Dakota institutions. And since agreements with other states were implemented during the study's timeframe (1972-1985) the other states served as a type of control in a field experiment. While enrollment varied with price relative to these "control" states, no such dramatic changes occurred in enrollments as can be seen in the case for Minnesota immigrants shortly after the implementation of the agreement. The

average elasticity of demand for the two largest recipients of Minnesota migrants showing statistically significant effects of tuition on enrollment was, in the short term (one year), -.7 (meaning that a 10% change in tuition resulted in a 7% inverse effect on enrollment). However the long-term effect (that probably more accurately reflects the effects of the significant change in tuition brought about by the new reciprocity agreement) was -2.1, suggesting that a 10% change in tuition will bring about a 21% change in enrollment. Their conclusion was that, "a reduction in the nonresident tuition rate would significantly increase enrollment".

A more focused study bearing on the reciprocity agreements by DesJardins (forthcoming), analyzed the enrollment impact of a surcharge on the tuition rate proposed for Wisconsin students under the reciprocity agreements between Minnesota and Wisconsin. Using measures of elasticity from an earlier model (St. John, 1994), estimates were made of the impact on enrollment of new entering freshman due to a planned tuition increase of $196 for students coming from Wisconsin. Because a disproportionate share of migrating students tend to be from more affluent families, and because students from higher need families would see a partial offset of the planned increase with more aid, the net effect of the increase in tuition was projected to be minimal (a drop of 8 students out of 1019). DesJardins also used the model to project the impact of increasing the tuition paid by Wisconsin students to the full amount paid by Minnesota students, or $785. Even under this more radical tuition increase scenario, the enrollment decline would be a modest 31 new freshman. However under this condition, the University would experience a net tuition increase of $687,000, more than enough to pay for additional recruitment efforts to make up for the loss of students.

Obviously, the elasticity coefficient should be appropriate to the population to which it is applied. "...it seems logical that price-response coefficients are most appropriately applied to the applicant population, or at the very least, to the population predisposed to attend college"(St. Johns, 1990, p.174). He and others (Heller, 1997) agree with the recommendation made by Leslie and Brinkman that the coefficients identified be multiplied by a factor of three to take into account the entire population of college age students and not just those who actually attend college.

Considering student price-response in the context of student migration, this analysis will apply a -.14 coefficient. Although arguments can be legitimately made for alternative estimates of elasticity (both lower and higher), -.14 reflects best the factors unique to this study and is used here.

Staying in the State of College Attendance

An important factor, critical to an understanding of the value of reduced tuition for nonresidents (reciprocity or otherwise) is the rate at which they stay in the state that they attended college compared to the rate for instate students. Although limited, the evidence available suggests that many students who migrate to other states for college end up staying in that state, but the rates at which they do so vary widely.

An early study done in California (California Coordinating Council for Education, 1970) found high rates of staying by nonresidents who came to California for undergraduate education. Two methods of evaluation were included. The first surveyed the intentions of students enrolled in the spring of 1967. The respondents indicated an expectation of staying in state at a rate of 77% as often as did his or her resident counterpart. A more focused study of Fresno State College graduates immediately following graduation in 1968-69, stayed at a rate of 80% as often as did instate graduates.

A Georgia study of engineering graduates (Georgia, 1998) shows a strong tendency for graduates of engineering programs to stay in the state that they received their degree. A recent study by the Indiana Fiscal Policy Institute (1999) showed that approximately 66% of bachelors degree recipients stayed in that state after graduation. However, an earlier Indiana study (1995) showed that, although between 71 and 83% of Indiana residents earning a degree were still in the state four years later, nonresidents remained at a rate between 10-45% (depending on the measure used).

A study that provides some indication about the Minnesota context was done at the University of Minnesota. The researcher surveyed 1996 graduates in 1998. Of the nonresident students who earned bachelors degree on the Twin Cities campus, 51% were living and working within Minnesota. The great majority of these were from Wisconsin (Zetterberg, 2001). No information is available on how many Minnesotans stay in the state after graduation that would allow for a comparison against the 51% rate for nonresidents.

Morgan (1983), in analyzing the effect of tuition on nonresident students found an interesting relationship between migration patterns of students across state borders and the general migration patterns. One of the statistically significant variables in

nonresident tuition is the relationship between student migration and the migration of the population as a whole to a particular state. The population migration obviously has much to do with availability of jobs, strength of the economy, and the quality of life of a particular state. Students apparently respond to these attractions as well. He goes on to say that if this is the case, an argument in favor of low nonresident tuition can be made based on the proposition that such a policy will build up the pool of highly trained manpower in a state. This will help attract industry to the state. He argues that there is at least some indication that, to the extent lower nonresident tuition rates attract students, these students are, in fact, coming for similar reasons as non-students. Thus, the subsidy that the state may provide to these students could be overcome by the taxes that these nonresidents may ultimately pay after graduation. Minnesota is a net importer of people into the state. So, it may be that the staying rate for Minnesota is higher than what would normally be expected.

Recent discussion of this issue (Leslie and Lewis, 2001) confirms the continued need to collect better data. "Although we do not have hard evidence about how many actually stay within the State, we do know that their coming to Minnesota to study has been economically very beneficial to the State" (Page 16).

DesJardins (2001) used a 70% stay rate (residents and nonresidents) for all bachelors degree recipients, which he termed "conservative", in estimating the tax benefits to the State of Minnesota from graduates of the University of Minnesota. But migrants' stay rates are probably lower, although how much is uncertain.

A simple method to learn precisely how many of the student migrants to Minnesota actually stay in the state has been proposed by the author. It would entail the sharing of graduation data from MnSCU and the U of M with the Minnesota Department of Revenue to determine how many of those graduates are still in the state paying taxes as compared to the number of Minnesota residents doing so. However, at this point neither MnSCU nor the U of M are willing to do so based on their view that the Data Privacy Act prevents them from sharing the necessary data. This suggests the need to modify current policies to improve data collection. In addition, HESO could include in the soon to be renegotiated reciprocity agreements provisions requiring all parties to track migrant students in their state.

Costs and Benefits of Increasing the Number of Students that Stay in Minnesota

The next question to be addressed is what are the benefits that accrue to the state from migrants from reciprocity and other states, and do these outweigh the additional costs of educating these new students at a lower rate of tuition. Conversely, knowing the costs and benefits associated with the provisions of the reciprocity agreements that

encourage Minnesota students to leave the state compared to keeping them in the state is also important.

A recent study by DesJardins (2001) indicates that for each new bachelors degree recipient who stays in Minnesota the state would reap an additional $57,018[3] just in individual income taxes. He also applies a "multiplier effect" of 1.9 that takes into account the ripple effect on tax revenues as a result of the economic activity generated by the spending of the additional income earned by the graduate throughout his or her lifetime.[3] This is a well established estimate of the increased economic activity to be expected. (e.g. Leslie and Lewis, 2001). The $57,000 tax revenue estimate and this multiplier factor will be used as the basis for estimates of the costs and benefits of the reciprocity agreements and possible changes to them.

Analysis

Incoming Reciprocity Students

This portion of the paper estimates the costs and benefits to the state of Minnesota of the incoming reciprocity students and estimates the effects of ending agreements that provide lower tuition to them. Although in all of the discussions regarding the current reciprocity agreements, no one has suggested ending the practice of providing reduced tuition to students coming from reciprocity states, an analysis of these agreements would be incomplete without considering the costs and benefits of this cohort of students to the state. A series of calculations are applied in order to obtain an estimated return on the investment made by the State of Minnesota. (The calculations applied here serve as the basis for the methods applied to the other questions in this paper and are therefore provided in greater detail in this section). These can be seen in ***Table 1***. First, it is necessary to identify the costs to the state to educate one undergraduate student in the public higher education system. This involves some assumptions. For purposes of simplification, the cost of educating a student is based on the state appropriation per student for a four-year period at both the University of Minnesota and state universities and a two-year period at the community and technical colleges.[4] These estimated costs to the state are then multiplied by the number of reciprocity students at each of the institutional types. For

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[3] It bears noting that the events of September 11th have resulted in a turndown in the economy in Minnesota that may modify this assessment

[4] Obviously, many factors can contribute to different costs including time to completion, drop out rates, differences in demographic mix of student body.

FY 99-00 the total number of reciprocity students attending public institutions in Minnesota was 14,372. The total costs for this cohort to the state of Minnesota is estimated to be $299 million.

Table 1

Costs/Benefits of Subsidizing Reciprocity Students Attending in Minnesota

	U of M	State U's	2-Year	Total
Reciprocity Students	5,775	5,388	3,210	14,373
State Subsidy[a]	$31,786	$16,400	$8,310	
Total Costs	$183,564,150	$88,363,200	$26,675,100	$298,602,450
Revenue per Graduate[b]	$57,000	$57,000	$36,000	
Revenue	$329,175,000	$307,116,000	$115,560,000	$751,851,000
Net Staying Rate (5)[c]	$164,587,500	$153,558,000	$80,892,000	$375,925,500
Revenue Multiplier (1.9)[d]	$312,716,250	$291,760,200	$153,694,800	$714,258,450
Net Income	$129,152,100	$203,397,000	$127,019,700	$459,568,800
Rate of Return	$1.70	$3.30	$5.76	$2.39

[a] The state contribution per FYE student for four years for bachelor's degree and two years for 2 year degrees

[b] Tax benefit received over 40 years per graduate

[c] Estimate of 50% rate at which students stay in the state following college completion

[d] Ripple effect on the economy of the additional tax revenues

On the revenue side, the calculations involve identifying income tax revenues for each graduate. Recent work by Desjardins (2001) estimates that the tax revenues over the lifetime (40 working years) of a new University of Minnesota graduate to be $57,000. That estimate is used in this analysis, both for the University of Minnesota and the state universities.[5]

To estimate a similar tax return for two-year college students, the economic value of the difference between a bachelors degree and a two-year degree were used to calculate the potential tax revenues for a two-year college graduate. Hearn and Bunton (2001) summarized research findings from the literature on differences in economic benefits for varying degrees of educational attainment. They cite numerous works that show considerable improvement in wages for bachelor degree recipients over those having associate degrees. One such study (Surette, 1997) shows that two-year degree recipients will have annual wage rates 58-66% that of bachelor degree holders. Thus, for this analysis, an estimate in the middle of this range (62%) was applied to determine the tax revenues for two-year degree recipients.

[5] There may be reason to estimate somewhat lower tax revenue for state university graduates based on the demographic differences between the students at state universities compared to the University of

Total tax revenue is determined by multiplying the estimated tax revenue by the number of reciprocity students. For all three institutional types the total tax revenue is calculated to be $752 million.

As pointed out, it is unreasonable to assume that all of the graduates who have come to Minnesota from reciprocity states will stay after graduation for the remainder of their working life. To account for this, a staying rate of .5 is used here. Applying the .5 staying rate leads to net revenues after expenses of $376 million. (As discussed earlier, this is one of the least well understood factors with respect to migration of students across borders and therefore, the .5 estimate is admittedly a rough approximation of what might actually be the case and is therefore, used for purposes of illustration. Varying the level of this factor has greater effect on the bottom line than any of the other factors applied in this model.)

Table 1A

Costs/Benefits of Ending Subsidy for All Reciprocity Students attending in Minnesota

	U of M	State U's	2-Year	Total
Reciprocity Students	5,775	5,388	3,210	14,373
Resident-NR Tuition	$8,586	$3,336	$2,151	
Est of not coming[a]	3,900	1,414	543	5,857
Est of remaining	1,875	3,974	2,667	8,516
State Subsidy	$31,786	$16,400	$8,310	
Total Costs	$59,602,661	$65,178,285	$22,162,213	$146,943,158
Revenue per Graduate[b]	$57,000	$57,000	$36,000	
Revenue	$106,882,013	$226,534,283	$96,009,585	$429,425,881
Staying rate (.5)[c]	0.5	0.5	0.5	0.5
Net revenue	$53,441,006	$113,267,141	$48,004,793	$214,712,940
Multiplier Affect(1.9)[d]	1.9	1.9	1.9	1.9
Total Revenue	$101,537,912	$215,207,569	$91,209,106	$407,954,587
Net Income	$41,935,252	$150,029,284	$69,046,893	$261,011,429
Rate of Return	$1.70	$3.30	$4.12	$2.78

[a] Estimate base on total reciprocity students multiplied by a student price response coefficient of -.14 per $100 tuition increase (in 1982-3 dollars)

[b] Tax benefit received over 40 years per graduate

[c] Estimate of 50% rate at which students stay in the state following college completion

[d] Ripple effect on the economy of the additional tax revenues

The next step in the calculation is to apply the multiplier effect of 1.9, consistent with the earlier discussion. Total tax revenue across all three types of institutions is found to be $714 million. Subtracting out the costs calculated above, the return on the investment is $460 million for students currently in Minnesota. Translating this return

into an annual estimate of savings is determined by dividing the net revenue by four. This assumes a complete turnover of the cohort of students under analysis here every four years, which is probably low for four-year students but high for two year students. This results in $115 million per year in additional revenues after expenses for the state.

A similar analysis is done in ***Table 1A*** that assumes that Minnesota no longer provides lower rates for reciprocity students and instead charges them nonresident tuition rates. As can be seen, the costs would be $147 million and revenues would be $407 million. Revenues after expenses would be $261 million. The effect of ending the current policy that allows reciprocity student to pay lower rates would cost the state $199 million (i.e. $460-261million) for the cohort or $50 million annually.

Using the model provided here, it appears that whatever modifications may be called for in reciprocity agreements, or for that matter, discontinuing the agreements, the state would be ill advised to change the arrangement in which reciprocity students are able to attend Minnesota colleges at approximately instate rates.

Costs and Benefits of Migration of Minnesota Students to Reciprocity States

This portion of the analysis attempts to understand the effect of policy changes to tuition reciprocity agreements if reciprocity states no longer afforded Minnesota students a discounted tuition rate. One of the outstanding questions and points of considerable debate during the 2001 legislative session is the uncertainty of the response of Wisconsin, North Dakota and South Dakota to any attempt by Minnesota to end or significantly modify the agreements. One of the substantial concerns of policymakers involves the fact that a disproportionate number of Minnesota high school graduates are attending college in reciprocity states and secondly that the state is spending (during the 2002-03 biennium) $10.5 million to offset this difference in student migration. Some, such as Higher Education Services Office HESO (testimony before the higher education finance committee, 2001 legislative session) argued that this investment was well worth the state's involvement in the agreements. They based this on the assumption that large number of Minnesota students who left the state would return as productive tax paying citizens. As discussed earlier, this is not well understood. Most evidence suggests that significant numbers of migrating students end up staying in the state in which they earn their bachelor's degree.

Second, HESO and others have argued that the state saves money from these agreements in as much as these students do not have to be educated at the cost of Minnesota taxpayers. This of course, is also plausible only if it is one assumed that large numbers of these students return to Minnesota.

It is possible, using the methodologies adopted in this study, to estimate how many Minnesota students now leaving the state would choose to stay in Minnesota if the reciprocity states were to substantially raise their tuition rates for Minnesotans. Based on this estimate, a comparison of the costs and benefits of the current agreements compared to modified agreements can be made.

Because of the complexities in determining the differences in tuition that each student would pay at the many institutions in each of the states, this analysis focuses on Wisconsin, the most significant state of the three reciprocity states. It uses only University of Wisconsin, Madison and state universities because very few students leaving Minnesota to Wisconsin attend two-year colleges (10 FYE's in FY2001).

The first part of this analysis considers the cost and benefits of the current situation in which 11,200 Minnesotans attend Wisconsin colleges at reciprocity tuition rates. As can be seen in ***Table 2***, the benefit to the state of Minnesota, assuming that 50% of them return, is estimated to be $597 million.

Table 2
Benefits of Students attending in Wisconsin at Reciprocity Rates

	Flagship	State U's	Total
Leaving	2,438	8,762	11,200
Rate of return[a]	0.5	0.5	0.5
Students Returning	1219	4381	5600
New Tax Revenues[b]	$69,483,000	$249,717,000	$319,200,000
Multiplier Effect(1.9)[c]	$132,017,700	$474,462,300	$606,480,000
Reciprocity Payment			-$9,000,000
Total Tax Revenue			$597,480,000

[a]Estimate of rate at which students stay in the state following college completion
[b]Tax benefit received over 40 years per graduate
[c]Ripple effect on the economy of the additional tax revenues

Next, the analysis considers what happens if Wisconsin no longer affords Minnesota students a reduced rate of tuition because the reciprocity agreements are ended. As can be seen in ***Table 3***, over 11,000 Minnesota students currently attend in Wisconsin. The large majority of these are at the state universities with a smaller number (2,438) at Madison. Using the elasticity coefficient applied earlier (-.14),

Table 3

The Effects of Wisconsin Deciding to Increase Tuition to Nonresident Rates for Minnesota Students: Migration Patterns and Attendant Costs and Benefits

	Wisconsin Institutional Type		
Calculations	Flagship	State U's	Total
Students Leaving	2,438	8,762	11,200
Difference Res/Nonres Rates	$8,586	$3,498	
Estimate of Non-leavers[a]	1,646	2,411	4,057
State Subsidy per FYE	$31,786	$16,400	
Total Costs	$52,332,140	$39,534,380	$91,866,521
New Tax Revenues[b]	$93,844,208	$137,406,078	$231,250,286
Multiplier Benefits(1.9)[c]	$178,303,996	$261,071,548	$439,375,543
Reciprocity Payment[d]			$9,000,000
Total Tax Revenue			$448,375,543
Return on Invest	$125,971,855	$221,537,168	$356,509,023
Tax revenues from returners[e]			$217,147,200
Total return			$665,522,743
Rate of Return	$3.41	$6.60	$7.24

[a] Students leaving multiplied by a student price response coefficient of -.14 per $100 tuition increase (in 1982-3 dollars)

[b] Value of a $57,000 tax benefit received over 40 years multiplied by number of non-leavers

[c] Ripple effect on the economy of the additional tax revenues using a factor of 1.9

[d] The saving to Minnesota since the agreements would be voided and the payment would no longer be necessary

[e] Assumes that 50% of those who still go to Wisconsin return and pay taxes

4,059 fewer Minnesotans would leave the state to attend college in Wisconsin if Wisconsin raised its tuition rate for all students from Minnesota to its nonresident rates.

Since these students would be expected to attend either the University of Minnesota or a Minnesota state university, it is possible to calculate how much additional state investment will need to be made in their education. The estimate is about $92 million.

These Minnesota students (like all other Minnesotans who attend within the state) are presumed to end up staying in the state and would generate an additional $439 million (after applying the $1.9 multiplier effect). In addition, the state would no longer be making the $2.25 million annual payment to Wisconsin currently called for in the reciprocity agreements. (This figure is multiplied by four in recognition that the cohort under study is assumed to turn over every four years). Accounting for both

costs and anticipated tax revenues, the additional students to the state can be expected to reap a return on investment to the state of Minnesota of over $357 million.

This sum must be adjusted to reflect the assumption that 50% of those who still go to Wisconsin return to Minnesota and generate tax revenues. These returning students will generate an additional $387 million, resulting in an overall benefit to the state of $665 million or a return of $7.24 for each dollar spent on students kept in the state as a result of a change in Wisconsin policy. The benefit of such a policy change would generate $68 million in additional revenues to the state over the current agreement. This translates into $17 million per year.

Since the previous analysis focused exclusively on Wisconsin, the following will review the costs and benefits of incoming students exclusively from Wisconsin so valid comparisons can be made. ***Table 4*** shows the findings from an analysis of the current flow of reciprocity student to Minnesota from Wisconsin that assumes 50% will stay in the state. Minnesota reaps a benefit of $222 million from the current arrangement with Wisconsin.

Table 4
Costs/Benefits of Subsidizing Wisconsin Reciprocity Students

	U of M	State U's	2-Year	Total
Reciprocity Students	4,278	2,778	817	7,873
State Subsidy	$31,786	$16,400	$8,310	
Total Costs	$135,980,508	$45,559,200	$6,789,270	$188,328,978
Revenue per Graduate[a]	$57,000	$57,000	$36,000	
Revenue	$243,846,000	$158,346,000	$29,412,000	$431,604,000
Staying rate (.5)[b]	0.5	0.5	0.5	0.7
Net revenue	$121,923,000	$79,173,000	$14,706,000	$215,802,000
Multiplier Affect(1.9)[c]	1.9	1.9	1.9	1.9
Total Revenue	$231,653,700	$150,428,700	$27,941,400	$410,023,800
Net Income	$95,673,192	$104,869,500	$21,152,130	$221,694,822
Rate of Return	$1.70	$3.30	$4.12	$2.18

[a]Tax benefit received over 40 years per graduate
[b]Estimate of rate at which students stay in the state following college completion
[c]Ripple effect on the economy of the additional tax revenues

Table 5 shows the effect of no longer providing Wisconsin students the reciprocity subsidy. Such a decision would result in Minnesota receiving tax revenues of $125 million, or a loss of $97 million over the current situation.

Table 5
Costs/Benefits of Ending Subsidy for Wisconsin Students attending in Minnesota

	U of M	State U's	2-Year	Total
Reciprocity Students	4,278	2,778	817	7,873
Tuition Diff- NR-R	$8,586	$3,336	$2,151	
Est of not coming[a]	2,889	729	138	3,756
Est of remaining	1,389	2,049	679	4,117
State Subsidy	$31,786	$16,400	$8,310	
Total Costs	$44,152,413	$33,605,285	$5,640,663	$83,398,360
Revenue per Graduate[b]	$57,000	$57,000	$36,000	
Revenue	$79,175,974	$116,798,856	$24,436,084	$220,410,915
Staying rate (.5)[c]	0.5	0.5	0.5	0.5
Net revenue	$39,587,987	$58,399,428	$12,218,042	$110,205,457
Multiplier Affect(1.9)[d]	1.9	1.9	1.9	1.9
Total Revenue	$75,217,176	$110,958,913	$23,214,280	$209,390,369
Net Income	$31,064,763	$77,353,628	$17,573,617	$125,992,009
Rate of Return	$1.70	$3.30	$4.12	$2.51

[a]Estimate of number of students who will no longer come to Minnesota due to increase in tuition determined by multiplying current
number of students coming to Minnesota by a student price response coefficient of -.14 per $100 tuition increase (in 1982-3 dollars)
[b]Tax benefit received over 40 years
[c]Assumes that 50% of those who still go to Wisconsin return and pay taxes
[d]Ripple effect on the economy of the additional tax revenues using a factor of 1.9

Concluding the analysis of the agreements, focusing specifically on Wisconsin and Minnesota, the current agreement reaps a benefit to Minnesota of $819 million compared to $791 million if the agreement was ended and all students migrating to either state were charged nonresident tuition. This is not the only choice, however. Even if Wisconsin chose to charge Minnesotans a nonresident rate, Minnesota, recognizing the large benefits of Wisconsin student attending in the state, could continue to provide the subsidy. In this case the benefits to the state would be $887 million or a saving of $68 million over the current agreement. (see ***Table 6***).

Although the number of students migrating between Minnesota and North and South Dakota is smaller than the number for Wisconsin, similar positive benefits from fewer migrants leaving the state and continuing the subsidy for students coming to Minnesota from these states are assumed to be positive.

Table 6

Benefits of Maintaining vs Ending Agreement with Wisconsin

	Agreement	No Agreement[a]	Partial Agreement[b]	Net Effect
Minn to Wisconsin	$597,480,000	$665,522,743	$665,522,743	$68,042,743
Wisconsin to Minnesota	$221,694,822	$125,992,009	$221,694,822	-$95,702,813
Total	$819,174,822	$791,514,752	$887,217,565	

[a]Assumes Wisconsin and Minnesota will require students from the other state to pay nonresident tuition pay nonresident tuition

[b]Assumes Minnesota continues to offer Wisconsin reduced tuition rates but Wisconsin does not do so for Minnesota students.

Uncertainty Exists Regarding the Response of Other States to Changes in Minnesota Policy

The previous analysis is based on an important assumption; that reciprocity states would no longer afford Minnesota students a lower tuition rate if Minnesota ended the reciprocity agreements. Considerable discussion at the Minnesota State Capitol related to whether or not ending reciprocity agreements would result in reciprocity states increasing the tuition for those students to nonresident rates. Policymakers need to consider that that might be the effect and assess the impact accordingly. There is good reason to consider, however, that institutions such as those along the Wisconsin border with very large numbers of Minnesotans on their campuses might decide that raising tuition substantially would not be in their best interest. For example, students from Minnesota attending in Wisconsin are estimated to pay over $35 million in tuition annually. Some of the Wisconsin institutions have extraordinarily high percentages of attendance by Minnesota students relative to their overall enrollment. For example, at the University of Wisconsin, River Falls, almost 49% of the entire student body is made up of Minnesota residents (see ***Table 7***).

As the analysis in this paper shows, substantially increasing tuition rates would result in large numbers of Minnesota students staying in Minnesota to attend college. The financial costs to those institutions and the communities in which the institutions reside, could be dramatic.

Table 7
Percent of Minnesota Residents at Selected Reciprocity Colleges

Institution	# of Students	% of total enrolled
NDSU Fargo	3,008	31.2%
UW Madison	2,856	7.1%
UW River Falls	2,782	48.7%
UW Eau Claire	2,512	24.1%
UND Grand Forks	2,442	23.1%
UW Stout	2,043	27.2%
SDSU Brookings	1,275	14.9%
UW La Crosse	1,273	13.7%
UW Superior	1,110	40.5%
Other Wisconsin	816	N/A
Other North Dakota	575	N/A
Other South Dakota	456	N/A

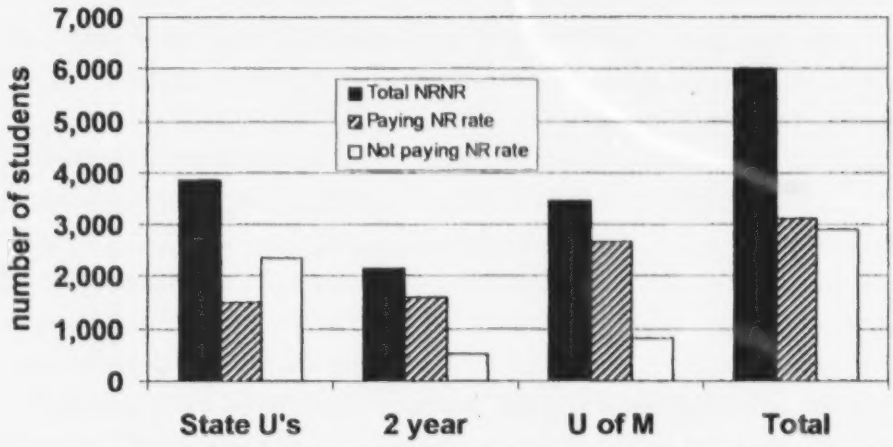
Assessing the Costs and Benefits of Nonresidents Who Pay Nonresident Tuition Rates

Although this paper is focused specifically on the reciprocity agreements, the reciprocity agreements are a part of a larger discussion about resident versus nonresident tuition rates. Therefore, it is worthwhile to assess the cost and benefits of the current nonresident tuition policy on enrollment and on the effect of this policy on the state's economy.

This portion of the analysis will estimate the costs and benefits of a change in policy that would result in students who are neither state of Minnesota residents nor beneficiaries of tuition reciprocity agreements and currently pay the nonresident tuition rate. Excluded from the analysis are those students who, although neither state of Minnesota residents nor reciprocity state students, are already receiving the benefit of a lower tuition rate. This analysis does not include those costs since any costs associated with the subsidization of these students are being borne by the individual institutions. Only the actual appropriations per student from the state are included.

The first part of the analysis required identifying the number of students who are NRNRs that are actually paying the nonresident tuition rates. (As mentioned earlier, the trend is for fewer NRNRs to be paying nonresident tuition). A substantial number of NRNRs are receiving a lower tuition rate than the sticker price of nonresident tuition would suggest (see ***Figure 3***).

Figure 3. Nonresident, Nonreciprocity Students Paying vs Not Paying Nonresident Tuition Rates



Two-thirds of the students at state universities are subsidized with instate rates. Approximately one-half of the total NRNR student population pays the nonresident tuition rate. If these students were given an opportunity to pay the instate rate, the cost to the state in additional subsidies to institutions would be $122 million (see ***Table 8***).

An estimate can be made of the positive impact of these students on the state's economy (totaling $280 million and, after accounting for the estimated educational cost borne by the state, is $157 million). But, these benefits cannot be included in the analysis of the value of a change in nonresident tuition rate policies. This is so because these students are already here and already paying a nonresident rate. Changing the resident rate only results in cost to the state and no additional benefits.

However, there is an effect of lowering nonresident rates to instate rates beyond the individual students already here and paying those nonresident rates. Taking into account the price response effect on enrollment, a calculation of the number of new students who would come to Minnesota as a result of the lower rates can be made. Using the same price elasticity estimates applied in the previous analysis, an

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Table 8
Analysis of Lowering Tuition to Resident Rates for Current Nonresidents

	U of M	State U's	2-Year	Total
NR Payers	2,651	1,501	1,617	4,152
State Subsidy[a]	$31,786	$16,400	$8,310	
Total Costs	$84,264,686	$24,616,400	$13,437,270	$122,318,356
Revenue per Graduate[b]	$57,000	$57,000	$36,000	
Revenue	$151,107,000	$85,557,000	$58,212,000	$294,876,000
Staying rate (.5)[c]	0.5	0.5	0.5	0.5
Net revenue	$75,553,500	$42,778,500	$29,106,000	$147,438,000
Multiplier Affect(1.9)[d]	1.9	1.9	1.9	1.9
Total Revenue	$143,551,650	$81,279,150	$55,301,400	$280,132,200
Return on Invest	$59,286,964	$56,662,750	$41,864,130	$157,813,844

[a] The state contribution per FYE student for four years for bachelor's degree and two years for 2 year degrees

[b]Tax benefit received over 40 years per graduate

[c]Estimate of rate at which students stay in the state following college completion

[d]Ripple effect on the economy of the additional tax revenues

additional 2,458 students would come to the state of Minnesota as a result of lower tuition rates (see ***Table 9***).

The additional costs to the state for 2458 students is $65 million. Estimates of tax revenues generated by these students result in total new revenues of approximately $134 million. However, once again it is important to apply an estimate of the likelihood that these students stay relative to Minnesota students. The same .5 staying rate is used here. Thus, net revenues are anticipated to about $67 million. Calculating the 1.9 multiplier effect leads to a total tax revenue estimate of $72 million. Subtracting the $128 million in cost results in a net return from new nonresident, nonreciprocity students to be $62 million or a rate of return of $1.94 per one dollar invested.

Table 9

Estimates of New Nonresident, Nonreciprocity Students and Their Costs and Benefits Resulting from a Reduction in Nonresident Tuition to Resident Rates

	U of M	State U's	2Year	Total
NR Payers	2,651	1,501	1,617	4,152
Tuition Diff- NR-R	$8,586	$3,336	$2,151	
State Subsidy[a]	$31,786	$16,400	$8,310	
New NRNRs[b]	1790	394	274	2458
Total Costs	$56,904,226	$6,458,901	$2,273,314	$65,636,442
Revenue per Graduate[c]	$57,000	$57,000	$36,000	
Total Tax Revenue	$102,043,066	$22,448,619	$9,848,293	$134,339,978
Staying rate[d]	0.5	0.5	0.5	0.5
Net revenue	$51,021,533	$11,224,309	$4,924,147	$67,169,989
Multiplier Effect(1.9)[e]	1.9	1.9	1.9	1.9
Total Tax Revenue	$96,940,913	$21,326,188	$9,355,878	$127,622,979
Return on Invest	$40,036,687	$14,867,287	$7,082,564	$61,986,538
Rate of Return	$1.70	$3.30	$4.12	$1.94

[a] The state contribution per FYE student for four years for bachelor's degree and two years for 2 year degrees

[b] Calculated by multiplying nonresidents by a student price response coefficient of -.14 per $100 tuition decrease (in 1982-3 dollars)

[c] Value of a $57,000 tax benefit received over 40 years

[d] Estimate of rate at which students stay in the state following college completion

[e] Ripple effect on the economy of the additional tax revenues

As discussed in the previous analysis, attracting and retaining the benefits of these new students comes at the cost of lowering the tuition rate for those who are already choosing to come and from whom the state is already receiving a significant benefit. Based on the assumptions in this model, the net effect of lowering the nonresident tuition rate for those who are actually paying it to instate rates would result in a net cost to the state of approximately $96 million (see ***Table 10***).

Table 10

Net Costs and Benefits Considering both the Increased Cost of Subsidizing Current Nonresident, Nonreciprocity Students and the Benefits of New Nonresident, Nonreciprocity Students

	U of M	State U's	2Year	Total
New NR Benefit	-$2,481,258	$5,513,696	$2,924,396	$5,956,834
NR Payers' Subsidy	-$84,264,686	-$24,616,400	-$13,437,270	-$122,318,356
Effect of Lower NR Rate	-$86,745,944	-$19,102,704	-$10,512,874	-$116,361,522

Calculating the benefit of institutional subsidies for NRNR students

A final analysis looks at the cost and benefits to the state of the subsidy that institutions are providing to NRNR's in the form of instate tuition. As illuminated earlier, a large and growing proportion of NRNR's are not paying nonresident tuition. Although this subsidy is not borne directly by the state it does represent an investment by public institutions that could be directed elsewhere or for that matter used to reduce tuition for instate students. ***Table 11*** provides an analysis of this cohort using the methods applied to the previous questions. It shows that that the state reaps a benefit of $201 million in tax revenue from this subsidy. Even after accounting for the institutional costs, the benefit still is $136 million or $3.10 for every dollar spent. If the resident tuition rate were not provided to this cohort of nonresidents, a reduction of 1,313 students (of the 3400 in this situation) is estimated using the methods adopted in this study.

Table 11
Costs and Benefits of Institutional Subsidy for NRNRs Not Paying NR Rates

	U of M	State U's	2-Year	Total
NR Non Payers	809	2,678	379	3,487
Institutional Subsidy	$22,344	$16,400	$8,310	$47,054
Total Costs	$18,076,296	$43,919,200	$3,149,490	$65,144,986
Revenue per Graduate[a]	$57,000	$57,000	$36,000	
Revenue	$46,113,000	$152,646,000	$13,644,000	$212,403,000
Staying rate (.5)[b]	0.5	0.5	0.5	0.5
Net revenue	$23,056,500	$76,323,000	$6,822,000	$106,201,500
Multiplier Affect(1.9)[c]	1.9	1.9	1.9	1.9
Total Revenue	$43,807,350	$145,013,700	$12,961,800	$201,782,850
Net Revenue	$25,731,054	$101,094,500	$9,812,310	$136,637,864
Rate of Return	$2.42	$3.30	$4.12	$3.10

[a] Tax benefit received over 40 years per graduate

[b] Estimate of rate at which students stay in the state following college completion

[c] Ripple effect on the economy of the additional tax revenues

Summary, Conclusions and Recommendations

Summary

This paper has provided the history and the current status of Minnesota's tuition reciprocity agreements. Although policymakers have been wrestling with the value of current tuition reciprocity agreements, the general lack of objective information and analysis of the topic has made it difficult to reach informed conclusions. One of the purposes of the paper has been to explore methods by which an objective analysis of tuition policies in general and the reciprocity agreements in particular, could be evaluated for public policy making. The methods discussed have provided the basis for exploring the value, in economic terms, of tuition reciprocity agreements and nonresident tuition policies to the state of Minnesota. Such methods could be useful to other states in assessing migration patterns and nonresident tuition policies.

Using a number of economic methods, this paper assesses the effects of possible changes in tuition reciprocity and nonresident tuition policies. These included:

1) Estimates of the number of students would choose not to leave Minnesota if reciprocity agreements were to be terminated and reciprocity states charged normal nonresident tuition rates,

2) Estimates of the number of Minnesotans who leave for college, return after graduation and how many migrants to Minnesota stay in the state after graduation,

3) An assessment of the costs and benefits of reducing the incentives to leave the state by Minnesota students to reciprocity states;

4) The enrollment and financial effects of ending nonresident rates for all migrants.

Econometric procedures were applied to available information about migration and enrollment patterns in Minnesota to address these issues. All of the econometric factors employed are methods drawn from previous research in the higher education literature. These include:

1) Estimates of the student price-response effect (elasticity) of changes in tuition on enrollments.

2) An assessment of the staying rates, or the degree to which migrants coming to Minnesota stay in the state and Minnesotan's who leave the state return after they receive their bachelor's degree.

3) A calculation estimating the tax benefits to the state from migrants staying in the state or conversely tax revenues lost as a result of Minnesotan's attending college elsewhere.

4) Modifying the previous tax revenue estimate to account for the present value of future tax revenues.

5) Calculating a multiplier effect, a method to account for the ripple effect in the economy of the additional spending activity of a college graduate.

Conclusions

Some things are clear. Enrollments of nonresidents will increase at Minnesota colleges if their tuition is reduced. More students from other states attending Minnesota colleges will result in more graduates staying in Minnesota for work. More workers from other states will reduce workforce shortages. Reciprocity agreements that provide a reduced tuition in other states for Minnesota students likely results in more Minnesotans leaving the state, many of who will not return after graduation.

In addition, the state of Minnesota benefits from the 14,000 students who attend a college in the state of Minnesota under the tuition reciprocity agreements. Based on the assumptions of the model applied, the state receives an additional $460 million in revenue, or a return of $2.39 for every dollar invested in subsidizing the cost of education for this cohort. However, the analysis also shows that without the agreements the state would still receive $261 million, $199 million less, but a higher rate of return of $2.78.

A second conclusion can be inferred from the assessment of cost and benefits associated with students who are leaving the state to attend elsewhere. Focusing on the largest reciprocity state, Wisconsin, this analysis shows that the current agreements are costing the state more in lost tax revenues and reciprocity payments than the benefit of reduced educational expenses. Specifically, assuming that Wisconsin were to no longer provide a lower tuition rate and instead charge Minnesotans attending college at public institutions in Wisconsin the full nonresident tuition rate, over 4,000 of the students currently going there would choose to stay in Minnesota. Those students along with those students who would return to Minnesota after completing

their degrees in Wisconsin would provide, after expenses, a return of $68 million (or $17 million annually) in tax revenue over the revenue generated under the current agreement between Wisconsin and Minnesota. A rate of return of $7.24 per dollar would be realized by investing in their education. This conclusion takes into account the fact that Minnesota would no longer be paying Wisconsin the $2.25 million it currently pays consistent with the provisions of the current agreements. In addition, the economic benefits of the current agreements are less than would be realized if Wisconsin no longer provided Minnesota students lower rates but Minnesota continued to do so for Wisconsin students. Extending this finding to the other two reciprocity states would lead to the conclusion that the current agreements cost the state as much as $34 million annually.

It is possible, however, that the issue would be moot if reciprocity states, for their own reasons, chose to continue to provide Minnesota student reduced tuition rates. In this case, Minnesota would still save on the costs of payments currently required. Since an assessment of the tuition reciprocity agreements cannot be complete without understanding the dynamics of the broader issue of nonresident tuition rates, this research includes a cost/benefit analysis of the econometric variables of students coming to Minnesota for college from states other than the reciprocity states. These students fall into two categories. First are those that are actually paying the nonresident tuition rate at the three types of institutions. Second are those who are paying an instate rate at the institutions at which they attend college. These institutions, for their own reasons, are subsidizing the difference between their resident and nonresident rates. With respect to the former, the effect of reducing nonresident tuition rates for the 4,152 students now paying the nonresident rate would result in additional costs of $122 million to the state. Although the state benefits from these students by reaping total revenues of $280 million, these benefits are already realized by the state and therefore cannot be included in a calculation of a net benefit by reducing nonresident rates.

However, the reduction of nonresident tuition rates to instate rates for those currently paying the nonresident rate would result in an increase of 2,500 students to the state. These students, although costing the state $66 million, would bring the state over $128 million in additional tax revenue. Even with the additional revenue from these new nonresident students, the total cost of a change in policy that lowers the nonresident rate to instate rates would have an overall cost of $96 million. Thus, the conclusion of this research is that it would not be in Minnesota's best interest, at least from a purely economic point of view, to reduce tuition for those students currently paying nonresident rates.

Finally, since a significant number of nonresident, nonreciprocity students are not being charged nonresident rates and are subsidized, not directly by the state, but rather by individual institutions, it is worthwhile to determine the benefits of this

subsidy to the state of Minnesota. And because the costs are not being paid for by the state, the net revenue in tax returns is quite substantial, topping $202 million. Even accounting for the costs picked up by the institutions ($137 million) the return on investment is $3.10 for every dollar spent. Thus, from a state perspective, the trend towards increasing numbers of nonresident, nonreciprocity students paying lower tuition subsidized by the institutions at which they attend would appear to be a sensible policy. Other questions, however, may need to be addressed with respect to this issue. Since the institutions are spending $65 million in tuition subsidies for these nonresident, nonreciprocity students, presumably these are expenditures that could be spent on other institutional expenses or, for that matter, on lowering tuition rates for Minnesota residents.

Recommendation

The study findings should provide additional insight for policymakers struggling with tuition issues and their relationship to migration patterns of Minnesota students out of the state and out-state students into Minnesota. However, these findings should be considered preliminary. First, a number of assumptions were made in order to apply the econometric factors used here. Little research has been done to shed much light on the issues of migration patterns, the price response for students facing very large increases or decreases in tuition or the staying rates of migrants in and out of the state. These factors need to be better understand before more certain conclusions about the value of reciprocity agreements can be reached.

Also, this research did not attempt to, indeed could not, address the questions regarding the degree to which Minnesota benefits from some of its students leaving the state to obtain an education in one of the careers experiencing worker shortages (such as nursing or pharmacy) and returning to Minnesota to pursue those careers. Again, the lack of migration data prevents this analysis. This shortcoming makes it difficult for policymakers to be certain about the value of the current agreements or whether some other arrangements could reap the benefits of the agreements without the costs. For example, knowing the number of students who are leaving to get nursing degrees could be the basis for targeted financial aid policies that encourage Minnesotans to seek this career path in another state and tax policies that encourage their return after graduation. The legislature should give directions and, where necessary, the authority to the U of M, HESO, MnSCU and other state agencies such as the Department of Revenue, to track graduates.

The use of student price response coefficients to estimate enrollment changes due to large tuition increases is one example of the need for more research. Some reason exists to believe that the estimate of elasticity applied in this study may be too

conservative. On the face of it, an elasticity coefficient as low as the commonly held assumptions available in the literature seem unreasonably small. The notion that fewer than half the number of residents from a reciprocity state would respond to a dramatic increase or decrease in enrollment in the neighboring state by remaining in their home state flies in the face of common expectations. The one study that sheds any light on this suggestion comes from an analysis of tuition changes on enrollment carried out by researchers looking at enrollment effects of tuition at South Dakota institutions. The price elasticity of demand coefficients found during the period of time that Minnesota and South Dakota entered into reciprocity agreements are illuminating. The two South Dakota institutions with the largest migration of Minnesota residents had an average price elasticity coefficient of -2.08, or fourteen times higher than the coefficient applied in this study. Thus, it is reasonable to assume that the elasticity of demand may be highly curvilinear, having a much greater impact on enrollment when tuition is substantially altered (2 to 3 times) from its current level. Further work should be pursued to better understand this issue.

Lack of quality information belies the concern that Minnesota lacks an adequate higher education infrastructure. Although the University of Minnesota and MnSCU collect and analyze data for their own purposes, little global statewide information is objectively analyzed for purposes of policy making. This was not always the case. The predecessor to the Higher Education Services Office (HESO) was the Higher Education Coordinating Board (HECB). This agency was acknowledged for many years as a source of high quality objective information on the Minnesota higher education environment. In the early nineties, that reputation changed. In part, this occurred because of the position it took in the controversial debates over financial aid policy. It was perceived to have taken sides in the high tuition/high aid debate, rather than provide an independent and objective analysis of the issue. No longer trusted as an independent and objective research organization, the research function was removed from its organizational mandate by the Legislature as part of dismantling of HECB and its reorganization into HESO in the mid 1990's. Discussions about reciprocity agreements and nonresident tuition policy are hampered by this continuing perception of a lack of objectivity. Because HESO has negotiated the agreements they are perceived to be unable to provide an unbiased analysis in this context as well.

No organization has filled the research void left by the original HECB. One of the lessons learned in the analyses provided by this paper is the tremendous need for greater investment in higher education research and analysis infrastructure that can be relied upon by the legislature and Minnesota's higher education institutions as an unbiased source of information. It is time for the legislature to provide resources and direction to the higher education community to fill this void in research infrastructure.

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